

1173-40 Pulmonary Circulatory Response to Endothelial Stimulation in Patients With Chronic Heart Failure

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Endothelial dysfunction has been reported to be present in various circulatory systems in patients (pts) with chronic heart failure (HF). However, pulmonary circulatory response to endothelial stimulation has not been studied. We studied 14 HF pts and 5 controls (C) without HF, protocol included direct infusion of adenosine 12 mcg/min (all 5 C and 7 HF pts) followed by acetylcholine (ACH) 10^{-6} M (all subjects), into the pulmonary artery (PA) and measured effect on angiographic PA diameter (PAD), intravascular Doppler velocity integral (VTI) and calculated PA blood flow (PABF).

Results: Effect of adenosine on PABF was similar in HF pts and C ($+70 \pm 13\%$ vs $+80 \pm 20\%$, $p = 0.44$). Infusion of ACH in pts caused heterogeneous response with decreased flow in 8 (group A) and increase in 6 (group B). A comparison between the 2 pts groups and C was as follows: (% change from baseline) * $p < 0.05$ vs C, ** $p < 0.05$ vs group A.

	C	Group A	Group B
PABF	$+80 \pm 42\%$	$-16 \pm 8\%$ *	$+88 \pm 32\%$ **
VTI	$+68 \pm 26\%$	$-13 \pm 6\%$ *	$+72 \pm 28\%$ **
PAD	$-8 \pm 5\%$	0%	$+2 \pm 3\%$

Conclusion: Pulmonary arterial dilatory capacity as measured by response to adenosine is preserved in pts with HF. In contrast, pulmonary arterial vasodilatory effect of endothelial stimulation with ACH is variable and is often abnormal in pts with HF.

1174 Atrial Fibrillation; Flutter

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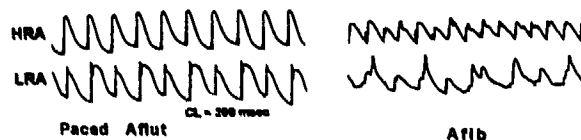
1174-161 Atrial Action Potential Alternans is Imminent Precursor of Atrial Fibrillation

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Background: T wave alternans is known to be a precursor of fibrillation in the ventricle but alternans of atrial repolarization preceding atrial fibrillation (Afib) has not yet been described.

Methods: Twenty-six patients with type I atrial flutter (Aflut) underwent deceleration overdrive pacing until Aflut was terminated or Afib ensued. Monophasic action potentials were recorded simultaneously from the high (HRA) and low (LRA) right atrium.

Results: Seven patients were cardioverted to sinus rhythm while 15 had Aflut converted to Afib. In 7 of these patients, initiation of Afib was preceded by a rate-dependent alternans of MAP duration and amplitude. Alternans occurred at both HRA and LRA (4 patients) or only one site (3 patients) (see Fig).



The other 6 patients did not show alternans at the recording sites but instead encroachment of pacing stimuli on the repolarization phase of preceding action potentials.

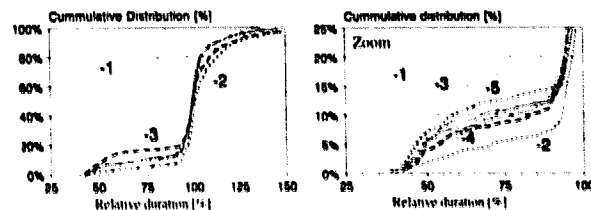
Conclusion: Action potential alternans is a frequent occurrence immediately before transition of Aflut to Afib. Atrial electrical alternans may be heterogeneous, possibly contributing to the spatial disorganization that leads to Afib.

1174-162 Alternating Short Cycles Before the Onset of Paroxysmal Atrial Fibrillation

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Background: Alternating cycle length durations are known to be important in the initiation of ventricular arrhythmias. To date this phenomenon has not been demonstrated for paroxysmal atrial fibrillation (PAF).

Methods: A database of 177 digitized and analysed 24-hour Holter recordings from pts with PAF was utilised. All episodes ≥ 30 sec noise free AF with 1 min of noise free preceding sinus rhythm were identified. The cycle length of each of the 10 beats prior to AF onset was compared to the median of the 10 preceding beats, and the results plotted as cumulative distributions:



Results: A total of 296 episodes from 42 recordings fulfilled the selection criteria. In the figures, lines represent the distribution for each beat before PAF (-1 = beat before, -2 = 2 beats, etc.) The right panel shows a detail of the left panel. Odd cycles (-1, -3, -5) were more often of short duration than would be expected by chance. The study was repeated on rhythm remote from PAF and no alternations were noted.

Conclusion: Final portions of sinus prior PAF exhibit alternating distributions of RR interval durations.

1174-163 Rate Dependent Conduction Block of the Crista Terminalis in Patients With Typical Atrial Fibrillation

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Background: Type I Atrial flutter (AF) is a macroreentrant circuit in which the Crista Terminalis (CrT) is the posterior boundary in the right atrium lateral wall (LW). To determine the conduction properties of the CrT, rapid pacing was performed at both sides of the CrT during sinus rhythm after bidirectional conduction block was achieved in the cavo tricuspid isthmus with radiofrequency catheter ablation.

Methods: In 12 patients (54 ± 16 years) with AF (cycle length 232 ± 36 ms) CrT location was identified by the recording of double electrograms during AF, between the lateral and posterior wall (PW). At least 5 bipolar electrograms were recorded from the high to the low right atrium. After sinus rhythm was restored pacing was performed at multiple cycle lengths from 600 ms to 2 to 1 local capture. A pacing site was selected at each side of the CrT in the LW and PW, from which all recording sites along the CrT were activated simultaneously at the longest pacing cycle length.

Results: No double electrograms were recorded during SR. Focal transversal conduction block in the CrT, recognized by the recording of double electrograms at at least one site was observed during pacing at 245 ± 42 and 261 ± 58 ms at the LW and PW respectively. Complete transversal conduction block along all the CrT (detected by the appearance of double electrograms at all recording sites and crano-caudal activation sequence) was observed during pacing at 212 ± 41 and 260 ± 133 ms at the LW and PW respectively. In 3 cases complete block was only achieved during pacing from one side, 1 from the LW and 2 from the PW. In the two patients with spontaneous episodes of atrial fibrillation, we observed fragmented electrograms (FE) circumscribed to the CrT area during rapid pacing. FE were absent in the remaining patients.

Conclusions: These data suggest the presence of rate dependent block of the transversal conduction in the Crista Terminalis in patients with typical AF. This block is usually observed at a pacing cycle length similar to the AF cycle length, suggesting that it may be a critical component of the macroreentry substrate of AF.

1174-164 Positive Atrial Inotropic Effects of Dofetilide Following Cardioversion of Atrial Fibrillation

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Background: Dofetilide is a class III antiarrhythmic agent which is effective in the treatment of atrial fibrillation (AF). In vitro studies have shown a mild positive inotropic effect of dofetilide in isolated heart muscle.

Methods and Results: In order to assess the effect of dofetilide on the human atrium we compared the Doppler echocardiographic features of 51 patients receiving dofetilide 500 mcg twice daily (Dof500) to 54 patients receiving placebo, all enrolled in a double-blind, randomized controlled trial of dofetilide for treatment of AF. Baseline characteristics were the same in both groups and echo was performed within 24 hours of cardioversion. Following cardioversion the height (cm/sec) and velocity time integral (VTI) of the A wave were significantly higher in the D500 group than in the placebo